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Contributions

—TO—

Western Botany.

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—BY—

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CONTRIBUTIONS TO WESTERN BOTANY. No. 8.

BY MARCUS E. JONES A. M.

AQUILEGIA DEPAUPERATA. 1 to 1½ feet high, erect, slender, in dense tufts; root leaves short and small, with petiole 4 to 5 inches long, biternate, primary divisions of petiole 1 to 2 inches long, secondary ones very short or almost none and leaflets approximate, leaflets irregularly incised and lobes crenately cut, obovate to rhomboidal, 6 to 9 lines long; stem leaves usually reduced to a broad winged petiole an inch or less long, with 1 to 3 sessile leaflets an inch long, 2 to 3 lines wide and entire or rarely with 1 to 3 teeth at the apex, rarely the lowest stem leaf has ordinary leaflets on slender petiolules crowning the broad petiole; lowest node rarely less than 6 inches from the root and bearing a long and slender peduncle (4 to 6 inches long) which is 1 to 2-flowered at the top; the second node has scarcely more than a bract subtending 2 peduncles, one of which is 1 and the other 2 flowered and longer, all the peduncles are long and slender; flowers cream colored, often tinged with blue, 15 lines long from stamen tips to nectary, sepals light colored, elliptical, 8 lines long, 2 to 3 lines wide, obtuse, barely green tipped, reflexed, 2 to 3 lines longer than the slender, equally tapering, straight spurs whose tips are connivent; claws of petals dilated, rounded, 3 lines wide, deep cream colored. Whole plant perfectly glabrous and leaves glaucous. Flowers nodding. This is near to the low altitude plant referred to by Watson Bot. King v 10 as an alpine form (he having misplaced his labels apparently.) It grows in springs in open places and along streams at 5500 to 7000 feet altitude. The type is my specimen from Provo Canon Utah collected June 8, 1896. To it I refer all

specimens heretofore referred to A. flavescens Watson with long slender stems, small flowers and reduced leaves.

AQUILEGIA CÆRULEA VAR. FLAVESCENS (Wat.) (A. *flavescens* Watson Bot. King v 10.)

There is a complete transition from flavescens through cærulea to chrysantha. Most of the species of Aquilegia are little more than soil and moisture varieties of two or more polymorphous species.

AQUILEGIA FORMOSA VAR. DESERTORUM. Delicate slender plants growing in the crevices of rocks near springs, about a foot high, stems flexuous; radical leaves rarely over ⅓ as long as the stems, small, biternate; primary divisions of petiole 1 to 1½ inches long, the central one-half longer, secondary divisions 1 to 6 lines long the central one twice the lateral ones and filiform; petioles dilated only at very base; nodes 2 to 3 inches apart; upper petioles reduced to rudiments and with primary divisions filiform, 6 to 12 lines long, the secondary divisions 1 to 2 lines long, or only the central one present and leaflets either 3-lobed or incised and divisions 1 to 3-toothed, all leaflets about 6 lines long, deeply incised, usually broadly cuneate-obovate, or when parted the divisions are of this shape; uppermost bract generally3-lobed with oblong lobes 2 to 3 lines long. Whole plant rather glaucous, glabrous except the upper inflorescence which is glandular-hairy. Peduncles 2 to 3 inches long in fruit, 5 to 10, rarely branched, flowers red, nodding, 15 lines long; filaments 5 lines long; sepals dark, elliptical-lanceolate, 4 lines long, spreading but not reflexed; blade of petals rounded, about as long as wide, 2 lines long, fully as wide as sepals, yellow; spur 8 lines long, the lower half linear and nectary well developed, straight; pods erect, 8 lines long exclusive of the long and filiform spreading styles (4 lines long), nervose, membranous; seeds black and shinning, about ¾ line long. Collected at Flagstaff, Ariz., Aug. 29, 1884.

ESCHSCHOLTZIA MINUTIFLORA VAR. DARWINENSIS. A foot high, freely branching toward the top; leaves nearly all radical, stem leaves reduced to mere rudiments; peduncles usually shorter than the 2-inch-long, slender capsules; torus turbinate, with

evident inner membrane a little produced; flowers golden yellow, 4 lines long; flower buds elliptical. Whole plant glabrous. Stems very many. Seeds the same as in the type species. Darwin Cal. on mesas, 4000 ft. altitude, April 28, 1897.

It has been the good fortune of the writer to see nearly all the types of North American Astragali during the past year, which enables him to make a number of corrections which are given below, mostly as to species recently described.

Astragalus lentiginosus Dougl. Hook. Fl. Bor. Am. i 151 has for a synonym *A cuspidocarpus* Sheldon Minn. Bot. Stud. Bull. ix 147. *A diaphanus* Dougl. Hook. Fl. Bor. Am. i 151 is only a young state of the same. Neither deserves varietal rank.

Astragalus lentiginosus Dougl. var. floribundus Gray Proc. Am. Acad. vi 194 has *A. ineptus* Gray Proc. Am. Acad. vii 525 as a synonym. This is not typical lentiginosus, but a well marked variety and intergrading at all points. It includes all forms with long and prostrate stems, short peduncles, and ovate to oval, thin, and papery pods. This does not include A. lentiginosus Dougl. var. latus Jones Cont. vii 675 which can be kept up with the original character as given in Zoe iv 272 and Zoe iii 287. *A salinus* Howell Erythea i 111 is for the most part the variety floribundus.

Astragalus lentiginosus Dougl. var Borreganus. Rather slender, annual, erect, about a foot high, hoary throughout; flowers and fruits racemose; peduncle with rachis slender and longer than the leaves; pods from ascending to a little reflexed lanceolate, little inflated, an inch long, slightly arched, very acute, wholly 2-celled; flowers purple, about 4 lines long, narrow; calyx cylindrical and with short teeth; leaflets 6 to 8 pairs, obovate, emarginate, 4 lines or less long. Collected at Borregos Springs, Southeastern California, by Orcutt.

Astragalus lentiginosus Dougl. var Yuccanus. At least the stems hoary and ascending to erect, often 2 feet high; pods glabrous, membranous, ovate, about an inch long, greatly inflated, on long and erect peduncles, wholly 2-celled and didymous; flowers many, spicate, erect, white or whitish; calyx cylindrical, tube narrow, 5 lines long, teeth short; early pe-

duncles subscaose. Collected by the writer at Yucca Ariz. 1884. Station now called Henning.

ASTRAGALUS LENTIGINOSUS DOUGL. VAR. PALANS (*A. palans* Jones Zoe iv 37.) There will be much doubt as to the distinctness of this form. Most people would call it a very good species, but intermediate forms occur. The *A. araneosus* Sheldon is an intergrading form.

Astragalus lentiginosus Dougl. var. Fremonti (T. & G.) Watson Bot. King v 66 is properly referred by Watson to A. lentiginosus.

ASTRAGALUS LENTIGINOSUS DOUGL. VAR. COULTERI (Benth), (*A. Coulteri* Benth. Pl. Hartw. 307.) cannot longer be kept apart from A lentiginosus and belongs to the group of annual forms. In Contributions No. vii 669 the writer wrongly referred the forms with glabrous pods (A. Fremonti T. & G.) to A. Coulteri as a variety, following other botanists in this.

Astragalus aridus Gray Proc. Am. Acad. vi 223 has a synonym in *A albatus* Sheldon. Minn. Bot. Stud. Bull ix 128.

Astragalus ursinus Gray Proc. Am. Acad. xiii 367 is a synomyn for A. Mokiacensis Gray l. c. and both are wholly distinct from A. ensiformis Jones Cont. vii 658.

Astragalus Bolanderi Gray Proc. Am. Acad. vii 337 has a synonym in *A. supervacaneus* Greene Erythea i 221.

Astragalus Pattersoni Gray var. procerus (Gray) Jones Cont. vii 636 has another synonym in *A. Rothrockii* Sheldon Minn. Bot. Stud. ix 174.

Astragalus diphysus Gray var. albiflorus Gray Bot. Ives 10, as to the type in the Gray Herbarium, is mixed with two other species one being a specimen of what is probably A. Pattersoni Gray but may be A procerus Gray. In the Engelmann collection all the specimens are white flowered forms of diphysus. See my Cont. vii as to the identity of the fragment in the Natl. Herbarium. The var. albiflorus should therefore be applied to the white flowered form of diphysus and should be suppressed.

Astragalus giganteus Watson Proc. Am. Acad. xvii 370 is a synonym for A. Yaquianus Watson Proc. Am. Acad. xxiii 270 and therefore there is no need even on the Brittonian basis for the synonym *A Texensis* Sheldon Minn. Bot. Stud. ix 65.

Astragalus Oreganus Nutt. T. & G. Fl. i 335 has a synonym in *A. ventorum* Gray Am. Nat. viii 212.

Astragulus aboriginum var. glabriusculus (Hook) *Phaca glabriuscula* Hook Fl. Bor. Am. i 144) has a synonyn in *A. Forwoodi* Watson Proc. Am. Acad. xxv 133. Watson described it as an annual while his type is clearly perennial.

Astragalus Labradoricus DC. Prod. ii 287 which is a substitute name for *A. secundus* Mx. Fl. i 66 is *A. Blakei* Eggleston Bot. Gaz June, 1895, p.271 also *A. Robbinsii* Oakes var. *Jesupi* Egg. & Sheldon Minn. Bot. Stud. Bull. ix 155. Micheli, the original collector, considered it only a form of A. alpinus and Gray and Watson followed him in this opinion, and it certainly is as near that species as it is to A. Robbinsii. A specimen of Micheli's is in the Gray Herbarium and though young can be identified as the species of Eggleston with reasonable certainty. It is in the writer's judgment a good species differing in the shape of the flowers and mode of growth from A. alpinus.

Astragalus argophyllus Nutt. T. & G. Fl. i 131 is not the same as A. glareosus Dougl. Hook Fl. Bor. Am. i 152 with which Gray confused it. Believing it distinct from glareosus and supposing Gray's reference of A. argophyllus was correct the writer made a synonym in *A. Uintensis* Jones Cont. vii. 670 because he was unable to see the type of argophyllus before publication. There is but one good specimen of A. glareosus extant (outside of his own herbarium) so far as the writer knows and that is in the Natl. Herbarium. The others are mere fragments in the Gray aud Phil. Acad. herbaria. All the specimens referred to A. glareosus in the Gray, Columbia, and National herbaria except this are A. argophyllus. A. glareosus has yet to be separated from inflexus Dougl. Hook. Fl. Bor. Am. i 151.

Astragalus argophyllus Nutt. var. Panguincensis. (*A. Chamæleuce var. Panguicensis* Jones Cont. vii 671.)

Astragalus Reverchoni Gray. Proc. Am. cad. xix 74 is a dubious species. It looks like a peduncled form of A. lotiflorus Nutt.

Astragalus Shortianus Gray var. cyaneus (Gray) (*A. cyaneus* Gray Proc. Phil. Acad. 1863 60) it is not the true A. Short-

ianus as Gray has latterly considered it, but it is a good variety characterized by the flat, broad, short, closely appressed hairs fixed almost by the base, and with the pod of A. Shortianus; while the true A. Shortianus has the round, long and slender hairs fixed by the base. The variety is ashy while the species is silvery-villous with appressed hairs.

Astragalus Shortianus Gray. var. *minor* Gray Proc. Am. Acad vi 211 is true A. cyaneus and not a form of A. amphioxys as Gray thought.

Astragalus Douglasii (T & G) Gray var. Parishii (Gray) (*A. Parishii* Gray. Proc. Am. Acad. xix 75.) To this also belongs *A. Tejonensis* Jones Cont. vii 644. The distinctions relied upon by Gray do not hold out. There is but one very poor specimen of A. Douglasii in the Gray Herbarium, all the other specimens being referred to A. Parishii.

Astragalus macrodon (H.& A. Bot. Beechey 333) Gray Proc. Am. Acad. vi 216 about which there seems to have been much doubt is, the writer believes, the same as *A. holosericeus* Jones Cont. vii. 638.

Astragalus triflorus (DC. Ast. 62 t. I.) Gray Pl. Wright ii 45 is *Candolleanus* (HBK vi 495) Sheldon Minn. Bot. Stud. Bull. ix 140. From a specimen in the Gray Herbarium, from the writer's Mexican material and from the original figure it would now appear that this is not distinct from *A. cerussatus* Sheldon. This will leave A. insularis Kell. to represent the Pacific Coast plants with A. Pondii Greene as a possible variety of it. The Pacific Coast species from lower Cal. has heretofore been regarded as the type of triflorus but it is a mistake, as is also the statement that the type is from Peru.

Astragalus insularis Kell. var. Quentinus. This includes the slender forms with many leaflets, oblique pods nearly an inch long, and plants nearly glabrous. The type specimens are from San Quentin, Lower California, collected by Orcutt. This has been called A. triflorus.

Astragalus playanus. Annual, either glabrous or ashy on the younger parts with closely appressed white hairs attached by the base; stems ascending, rather robust to weak, a foot long,

with the habit of A. Geyeri, pubescent; leaflets long-petiolulate, narrowly oblong, not thin, obtuse to emarginate, 5 to 7 pairs; petioles always evident; inflorescence about as long as the leaves; young pods minutely pubescent, pods oval, 1 to 1¼ inches long, equally acute at both ends, only the young ones somewhat oblique; flowers purple, striate; peduncles axillary nearly throughout, rather stout, reflexed mostly, 1 to 1½ inches long, with several pods on the upper two-thirds. This is the annual form hitherto referred to A. triflorus. It is found on the plains of western Texas, New Mex. and Ariz. The types are the specimens of the writer's collection of 1884 from El Paso, from New Mex. and Ariz. and all specimens referred to in Cont. vii 637 under A. triflorus.

There is much confusion in this group yet, and some changes may need to be made.

ASTRAGALUS GEYERI GRAY VAR. TRIQUETRUS (Gray) (*A. triquetrus* Gray Proc. Am. Acad. xiii 367.) This is intermediate or nearly so between A. Geyeri and A. sabulonum. It is placed by Sheldon among the thick walled argophylli and scytocarpi!

Astragalus fastidius (Kell.) (*Phaca fastidia* Kell. Hesperian iv 145, 1860. *A. fastidiosus* Greene Bull. Cal. Acad. i 186.) I see no occasion for the name of Greene. It is just as good Latin for Dr. Kellogg to coin the adjective fastidia from fastidium nausea, as it is to make any other combination in Latin, and it accords with the spirit of classical Latin, while the name of Greene is a derivative of the same noun with a different meaning, being intensive, from that intended by Kellogg. This species is the A. curtipes of most writers as to nearly all the specimens referred to A. curtipes, but it is not the true A. curtipes of Gray Proc. Am. Acad. vi 217 of which there seem to be only two specimens extant, the type in the Gray Herbarium, and a specimen in the Herbarium of the University of California, from San Luis Obispo, Cal. The type has stipules conspicuously connate and hyaline even to the tip, while A. fastidius has the stipules not connate or indistinctly so at the base. Whether this distinction is of specific value is yet to be determined. A. fastidius is, the writer thinks, the *A. leucopsis* var. *brachypus* Greene Pitt. i 33

(var. *curtus* Sheldon Minn. Bot. Stud. ix 134.) Blanche Trask's specimen from Catalina Is. Cal. has very short calyx teeth, pubescence very short, stipe 4 lines long, leaflets lanceolate to narrowly-oblong, pods oblong-oval, acute at base, 1 inch long, little oblique, hoary stems and young parts, pubescence tangled, upper side of leaflets glabrous. The var. brachypus has distinct stipules and truncate base of pod.

Astragalus frigidus (L. Fl. Suec. Ed. II No. 657.) Gray Proc. Am. Acad. vi 219. This, as to all American forms seen by the writer, agrees perfectly with the var. littoralis (Hook. Fl. Bor. Am. i 141) Watson Index 193, which therefore should be suppressed unless the real Linnean type differs from the specimens distributed from northern Europe.

ASTRAGALUS AMERICANUS (Hook.) (*Phaca frigida* L. var. *Americana* Hook. Fl. Bor. Am. i 140.) From all the specimens in this country, and they are very many, this seems to be a well marked species.

Astragalus Pulsiferæ Gray Proc. Am. Acad. x 69 has a synonym in *A. Suksdorfii* Howell Erythea i 111.

Astragalus Bajaensis Sheldon Minn. Bot. Stud. Bull ix 169 is very near to A. Hornii var. minutiflorus Jones Cont. vii 677 and is not at all related to A. Fremonti where Sheldon placed it.

Astragalus scobinatulus Sheldon Minn. Bot. Stud. Bull ix 24 which is not different from A. Haydenianus Gray, as to its types, has been greatly confused by Mr. Sheldon. The Kansas specimen in the Natl. Herbarium referred to as a part of the type is a white flowered form of A. bisulcatus, the Columbia College specimen is A. racemosus, while the only remaining specimens, the types of the writer's variety major of A. Haydenianus, do not seem to deserve varietal rank. See Cont. vii 646. Mr. Sheldon has also named A. racemosus Pursh No. 16415 Mo. Bot. Garden as scobinatulus and also many other specimens of that species in the same herbarium.

Astragalus Daleæ Greene Pitt. i 153 is only a synonym for A. Hartwegi Benth. Pl. Hartw. 10, or A. vaccarum Gray so far as the flowering specimen can be determined.

ASTRAGALUS CONJUNCTUS WAT. VAR. HOODIANUS (Howell) (*A. Hoodianus* Howell Erythea i 111.) This antedates the writer's var. *oxytropidoides* Cont. vii 665 and should take the name. There is still too little material in this group to make the names of species anything more than tentative.

Astragalus miser Dougl. Hook. Fl. Bor. Am. i 153 has a synonym in *A. microcystis* Gray. Proc. Am. Acad. vi 220.

Astragalus Guatamalensis Hemsley Biol. Cent. Am. 264, has a synonym in *A. Oaxacanus* Rose Cont. Natl. Herb?

Astragalus oophorus Watson Bot. King v 73 has a synonym in *A. artipes* Gray Proc. Am. Acad. xiii 370.

ASTRAGALUS SALMONIS. n. sp. Many crowned perennial, with woody root and cæspitose, proper stems none or 1 to 2 inches long, prostrate; whole plant sparsely puberulent; leaves 2 to 3 inches long, of 4 to 5 pairs of distant, elliptical, barely acute to obtuse, flat leaflets, 3 lines or less long; petiole ⅓ the length of the rachis of the leaf, slender; lower leaflets inclined to be small and oval; flowering peduncles scapose, 3 to 4 inches long, slender, ascending to erect, with 3 (rarely more), racemose, white flowers which are 6 lines long and in fruit are spreading to horizontal; pedicels slender, 1½ lines long, twice as long as the ovate, hyaline bracts; calyx tube strigulose-hairy with short appressed hairs, 2 lines long, campanulate-cylindric, straight, saccate at base on the upper side but with the pedicel inserted in the middle, teeth subulate and a line long; banner oblong-oval, equally arched from base to apex with the tip standing at ninety degrees to the base, sides reflexed almost to the middle, erect part of banner almost 3 lines long; wings broadly oblanceolate, 1½ lines wide at the rounded end, and erect beyond the keel, a line longer than keel and exposing its base, a line shorter than the banner; keel straight, blade 2½ lines long, apex rounded, incurved to 130 degrees and obtuse, the end 1½ lines wide, the very tip purplish; young pod flattish, recurved by the arching of the ventral suture and arched to ¼ circle, shortly acute at both ends, when mature an inch long, 3 lines wide and 2 lines thick, coriaceous, wrinkled and mottled, cross section obcordate with ventral suture raised and thick, sulcate dorsally and with suture intruded

⅓ to ½ the width of pod; stipe stout, as long as the calyx and not jointed to the pod. This is nearest to A. Panamintensis Sheldon Bot. Death Valley Exp. 87 and is allied to A. obscurus Watson Bot. King. v 69. It differs from A. Panamintensis in the shape and number of the leaflets, the pubescence, in the calyx not being narrowed below, in the larger pods, in the white not purple flowers, and in the habitat which is in the high mountains of Oregon. This has been called A. Bourgovii by many and is so referred in the Gray Herberim but not by Gray. Trout Creek, Blue Mts. Oregon, May 25th, 1885, Howell. Union Co. Oregon, May to June, Cusick. Also by Leiberg in the same situations in 1896. First collected by Barthoff at Harney, Oregon, April to May, 1875.

Astragalus oocalycis n. sp. Habit of A. pectinatus Douglas. Erect, perennial, stems flexuous, two feet high; leaves thick, ascending 4 inches long, with rachis 3 inches or less, and the petiole about an inch long, rachis tapering and channeled; stipules hyaline, deltoid-triangular, connate below, 2 to 3 lines long, adnate; leaflets 8 pairs, opposite, linear-elliptical, acute at both ends, long-petiolulate, puberulent below, glabrous above, 1½ inches long, 3 to 6 lines apart, nodes 1 to 1½ inches apart; peduncles 3 inches long, stout; flowers densely spicate in a head 2 inches long, nearly sessile, reflexed somewhat; hyaline bracts 3 to 4 lines long; calyx greatly inflated, 4 lines long, 3 lines wide, hyaline, obliquely inserted, base straight, upper side arched especially near the base, teeth triangular and a line long; the pods are those of A. Haydenianus, very shortly stipitate, obcompressed, oval, 3 lines long, 1½ lines wide, ventral suture thick and raised, pod finely cross-striate, not at all exserted from the calyx, glabrous; corolla white, 3 lines longer than the calyx; banner oval, thick at base, arched to 45 degrees or more in a gentle arc, erect part a little over a line high, sides reflexed above; wings oblanceolate, nearly straight, nearly as long as banner, about a line longer than the obtuse, short, purple-tipped keel; calyx villous with white hairs. This has in common with A. Grayi, A. grallator, A. Pallisen and A. hyalinus the appearance of being a sport. A. *grallator* and A. *Pallisen* have been proven to be

sports, but there is as yet nothing to warrant this being classed as such and therefore must needs be described. If it is a sport it comes from A. racemosus. Collected on bottom lands at Aztec New Mex. and communicated by Prof. Wooton. If A. Grayi is a sport it comes from A. pectinatus, and A. hyalinus from A. triphyllus, while A. Palliseri comes from A. decumbens. All seem to be caused by insect agency or possibly by fungoid growths.

Astragalus Lagunensis n. sp. Resembling A. Francisquitensis Jones Cont. vii 666 but pods triangular-cordate in cross section, deeply sulcate dorsally, tip pungent ½ a line long; leaflets 7 to 8 pairs, narrowly elliptical, 2 lines long and a line wide, rounded at both ends, shortly petiolulate, canescent throughout; leaves 1 to 2 inches long; nodes about an inch apart. Lower California Brandegee. The material of this and A. Francisquitensis is very meager and the limits of the species can be only be guessed at.

Astragalus reventus var. Canbyi. Proper stems very short, from a compact woody root; peduncles about 12 inches long, and half longer than the leaves; leaflets 10 or more pairs, 9 lines long or less, ½ line wide, emarginate; pods few, racemose, near the end of the peduncle, erect, on very stout pedicels 2 lines long which nearly equal the subulate bracts, ovate, 6 lines long, 4 lines wide, 3 lines thick, very fleshy and wrinkled, sutures triangular in cross section externally, raised, dorsal barely thickened within, pod truncate at base and with evident stipe when dry, inflated, opens at tip along both sutures, probably is a little sulcate dorsally at times, but nearly round, flattish ventrally, glabrous, beak sharp and triangular; flowers not seen. The pods split the calyx when ripe, and are straight. Yakima region Wash. Brandegee No. 36, 1882. This differs from A. reventus in the connate stipules and stipitate pod. The validity of these characters is yet to be determined, but if they are not good there will have to be a wholesale reduction of species in this group.

Astragalus Coltoni Jones var. Moabensis. Leafy, leaves never filiform, all jointed to the rachis, elliptical to linear; pods obliquely elliptical, 9 lines long, 2½ lines wide, horizontal or re-

curved, but calyx spreading only. Collected at Moab by Miss Eastwood and by myself at Green River, Utah.

Astragalus recurvus Greene Bull. California Acad. i No. 3 155, is a good species but near to A. Rusbyi Greene. The note in Contributions No. vii referring it to A. lancearius should have been suppressed. The material of this species is very scanty and fragmentary there being one good specimen in the writer's herbarium (referred to in Cont. vii) and some flowers in the Brandegee Herbarium, as well as the poor specimen constituting the type.

Astragalus Inyoensis Sheldon Death Valley Rep. 86 can hardly be separated from A. albens Greene.

Astragalus Phœnicis (*A. intermedius* Jones Cont. vii 556.) The name intermedius is preoccupied.

Astragalus Eurekensis, A. glareosus Jones (not Dougl.) Cont. iii 291, not A. cibarius Sheldon. This is a well marked species which the writer had very doubtfully referred to A. glareosus Dougl. The description is misleading as the pod is not really 2-celled, the dorsal suture is only sulcate and not intruded, but the sulcus is so deep as to make the pod seem 2-celled.

Astragalus cibarius Sheldon Bull. Minn. Bot. Stud. ix 149. Having seen all his types of this species it proves to be based on A. diphysus Gray and *A. arietinus* Jones and therefore must supersede the writer's name, as a part of his types and most of his description belong with *arietinus*.

Astragalus pruniformis Jones Cont. vii 660 is too near A. Hendersoni Watson, the only difference being the less numerous leaflets. The name should then be suppressed.

Astragalus Chamæleuce Gray Bot. Ives Rep. 10 in part. There seems to have been no need of Dr. Gray's name, as Astragalus pygmæus DC. and Astragalus pygmæus Pall. were both synonyms; the one being A. nanus and the other Oxytropis nigrescens. The name however has been out of use so long that it need not be revived.

Astragalus Chamæleuce var. cicadæ (*A. cicadæ* Jones Cont. iv 35.) Having collected A. Chamæleuce in the type

locality of Nuttall it is certain that *A. cicadae* is only a variety of it as had long been suspected.

Astragalus diversifolius Gray P. A. A. vi 230. Having recently collected the typical form in abundant material it is the writer's opinion that it can be maintained as sufficiently distinct from A. junceus Gray to warrant the latter being placed under it as a variety, namely ASTRAGALUS DIVERSIFOLIUS var. JUNCEUS (Nutt.) (Homalobus junceus Nutt T. & G. Fl. i 351) There is no reason why Astragalus junceus should not stand as an unoccupied name for the A. junceus of Ledebour is a synonym of A. Stevenianus DC.

ASTRAGALUS SERICOLEUCUS Gray var. ARETIOIDES. Plants densely congested, peduncles almost none; flowers peeping out from the edge of the stipules; leaves very short and sessile; pod hoary and leaflets usually acute. H. Engelmann, Simpson's Exp. Aug. 19, 1858, mountains near Sweetwater river, Wyo. This is the type. Other specimens are in Nuttall's collection in Herb. Phil. Acad. on the same corner of the sheet as is the type of his Phaca sericea and confused with that species by Nuttall and all who have followed him. Nuttall's description however belongs with the other specimen. Hayden "Gravelly hills, Wind river Valley, Wyo. 5500 feet alt., abundant, May 18, 1860." This has obtuse and often obovate leaflets. A specimen of A. Nelson from Wyoming has obtuse leaflets and very small flowers. This does not differ from Collin's specimen of A. tridactylicus from Colorado except in the hoary pod. The typical form of A. tridactylicus Gray has long petioles and rather large flowers, but many specimens have almost no petioles and smaller flowers, the glabrous pod being the only separating character.

ASTRAGALUS CHAMÆLEUCE var. LACCOLITICUS (*A. cicadae* var. *laccoliticus* Jones Cont. vii 672.) This has the pod of A. Musiniensis and pointed leaflets. It will probably prove to be a good species when studied more in the field, and may then bear the name A. LACCOLITICUS.

ASTRAGALUS GRACILENTUS var. HALLII. (Gray.) *A. Hallii* Gray P. A. A. vi 224.)

ASTRAGALUS GRACILENTUS var. GREENEI (Gray.) (*A. Greenei* Gray P. A. A. xvi 105.)

ASTRAGALUS GRACILENTUS var. FALLAX (Wat.) (*A. fallax* Watson P. A. A. xx 362) is a form with larger flowers and short calyx lobes.

Astragalus Fendleri Gray Pl. Wright ii 44 is a synonym of A. flexuosus Dougl. Hook. Fl. Bor. Am. i 140. Watson confused this with the gracilentus forms in P. A. A. xv 362.

ASTRAGALUS PINONIS, n.sp. Frisco, Utah, June 22, 1880, at about 8000 ft. alt. among junipers and pinons, in gravel. Perennial, rather slender, ashy-puberulent throughout, nearly erect, stems branched below, rounded and flexuous, about 6 inches high, nodes usually 6 to 9 lines apart; stipules triangular, small, a line or less long, not membranous, distinct; leaflets linear, rounded at both ends and barely petiolulate, 4 to 10 pairs, 6 lines long, a line wide, not contiguous, leaves 2 to 3 inches long, all short-petioled; proper peduncles 1 to 2 inches long, shorter than the leaves, slender, racemosely few-flowered, the rachis equals the peduncle or is half as long; fruit pendent on 2-lines—long, slender pedicels; bracts triangular, half a line long; calyx campanulate, narrowed below, the tube a little over a line long, subulate teeth half the tube; flowers probably purple; keel about two lines long and purple tipped, tip abruptly erect, straight, acute, produced, nearly 1½ lines high, ¾ line wide at base, equaling the oblong wings; banner oval about as long as keel; these are not fresh flowers, being only fragments on the pods; pods straight, short-stipitate, linear-oblong, shortly acute at both ends, a little larger above, 2 lines high and nearly as wide, 9 lines long, corrugated, somewhat inflated, coriaceous, both sutures narrow and rounded externally, the ventral a trifle raised, neither suture at all intruded and pod wholly 1-celled, ventral side nearly straight, dorsal convex. This has the appearance of A. atratus but the pod is nearer A. Pattersoni. This has remained unpublished for 17 years with the hope of finding good flowers and more ample material, but it has not been seen yet.

ASTRAGALUS CANONIS, n.sp. Big Indian Canyon near Hawthorne, Nev. May 27, 1897, 4700 ft. alt, in alkaline, scoriaceous, porous soil, on south slopes and along the creek. Slender stems, petioles and peduncles round, barely sulcate, tapering upwards. Plants about 2 ft. high, much and widely branched below forming clumps 2 to 3 ft. in diameter and outer stems decumbent; root thick, stout, perennial; lower stipules hyaline and very wide, 1 to 2 lines high, distinct, upper triangular, stiff, green, reflexed, about a line long, and distinct; nodes 4 inches or less apart; middle leaves the largest, 4 to 5 inches long, with 2 to 3 pairs of leaflets, lowest leaves often barely 1 to 2 inches long, of 3 oval leaflets, 6 or more lines long, the upper leaves have leaflets which are narrowly-elliptical to linear-lanceolate, but always with more or less of a lanceolate outline, 1 to 2 inches long, 2 to 3 lines wide, leaflets on the uppermost leaves nearly linear, all leaflets have a white mucro, are distant, petiolulate, and jointed to the green rachis; peduncles subterminal, 6 to 12 inches long, flowers fully an inch long; calyx nigrescent with minute hairs; pods 1 to 1¼ inches long, a little arcuate, when old and dry, 3 lines high and four lines wide, with ascending mucro, 3 lines long from a flat and deltoid base, ventral suture nearly a line wide, a little depressed, dorsal suture narrow and raised externally, pod with close set transverse rings, sometimea with faint lateral lines but forming no distinct meshes, texture woody, both sutures intruded, the lower one goes ½ to ⅔ across but the sutures do not quite touch, pod 1-celled at very apex, only a trifle inflated; cross section oblong-reniform, seed-bearing throughout, opening at the tip. Characters taken from the fresh plants are as follows: tufted, straggling; leaves silvery beneath with minute appressed pubescence, green but with closely appressed, stiff, short hairs; flowers racemose; calyx on stout pedicel a line long in flower; triangular bract stout, a line long; calyx tube 3 lines long, 1½ lines high, ¾ line wide, very much compressed, arcuate, equally inserted, but the upper corner cut off and sloping into the pedicel, hyaline, but fleshy at base, cleft deeper above, teeth equal, subulate, 1 line long; banner oblong-ovate, 7 lines long, gently arched to 80 degrees at calyx tips,

sides reflexed to the sulcus, a line deep and mostly below, the edges nearly touch behind, pink-purple, deeply notched, white spot narrowly oblong, 5 lines long, filling all of the sulcus, interruptedly purple-veined, goes almost to the tip where it shades into purple, sulcus U-shaped below but it soon disappears into a mere groove above 2½ lines below the tip; petals thin; wings 2½ lines long, oblong, oblique, notched on the lower side near the tip, fully a line wide, obtuse tip a trifle larger, scarcely arched, purple above, concave to keel and tips overlapping beyond keel, not flaring, 1½ lines longer than keel; keel 1½ lines long and high, abruptly rounded to 90 degrees, with tip obtusely-triangular; banner 5 lines longer than keel; pods strongly and sharply conical-subulate beaked, round, smooth, fleshy, sides equally thickened ½ line thick, outer part a transparent pulp, inner more fibrous, but it cuts very easily and is not woody, full of pulp, not stipitate (when dry the pulp shrinks away and leaves a distinct pseudostipe ½ to 1 line long) dorsal suture intruded ½ to to ⅔ the way; leaves not fleshy, sharp, but they are very hard to dry; flowers tipped with pink-purple, horizontal to a trifle reflexed; pods ascending on a horizontal very stout pedicel, in the green pod each cell is almost cylindrical. This differs from A. nudus Watson in the 2-celled pod, broad and large leaflets, in much the same manner as A. reventus differs from A. conjunctus. A. Shockleyi Jones is very near to A. nudus but can still be kept apart from it by the shape and character of the pod, though it is probable that they will intergrade as more material comes to light.

ASTRAGALUS CRASSICARPUS var. PACHYCARPUS (*A. pachycarpus* T. & G. Fl. i 332). This seems to be a good variety. It is Texan, though it is found in Arkansas and even in Missouri. Stems slender with many nodes, rather short subulate stipules; the most developed leaflets are in 11 to 16 pairs, narrowly-elliptical-oblanceolate, rather long-petiolulate, less than 6 lines long; peduncles 1 to 3 inches long, usually 2 inches long, few-flowered; calyx cylindric; pedicels slender; bracts long-subulate; 2 lines long; flowers slender, white or whitish, 8 to 9 lines long; plants nearly glabrous, calyx hairs either absent or rather sparse

and appressed; pods round to oblong; stems 1 to 2 feet high; plants leafy with slender and graceful leaves. No. 399 Wislizenus May 27th, 1846 7 on Prairies from "Independence westward, common;" April, 1849, Brazos Texas, Lindheimer; No. 230 Lindheimer; April, 1844, Prairies of the San Felipe, Tex.; No. 339a Victoria Tex. Feb, 1845, Lindheimer; No. 596 Lindheimer, clayey soil near Victoria Tex. 1845; No. 412 Lindheimer, New Braunfels, Tex. April, 1844; No. 598 Lindheimer May, 1844; No. 17158 Missouri Bot. Garden, Tex.? Probably belongs here also Engelmann's specimen from Missouri 1835. Gattinger also has a specimen labeled "Lavergne May 13th, 1881." This variety approaches A. Mexicanus and A. Plattensis in its leaves.

Astragalus agrestis Dougl. Don. Mill 2 257. This can easily be distinguished from the allied European hypoglottis L. by the shaggy calyx (not simply nigrescent), long calyx teeth, and long bracts. Ours is also (if at all pubescent) rough or puberulent, while the the other is softly pubescent on the leaves.

Astragalus occidentalis (Wat.) (*A. Robbinsii* var. *occidentalis* Watson Bot. King. v. 70). This differs from A. elegans Hooker in the upper leaves being never sessile nor condensed, width of leaflets fully ⅓ their length (6 lines long), stems weak and decumbent, plants nearly glabrous, pods only nigrescent and with short stipe nearly as long as calyx. It differs from A. Robbinsii Oakes in the short stipe; strictly lunate not flat pods, acute at both ends, nearly as wide as high; and 6 to 7 (not 3 to 6) pairs of leaflets. Having collected this during the present year in Watson's type locality and studied it carefully in the field in every stage of growth there is no hesitation in raising it to specific rank. Watson in his description sees no evidence of a dorsal intrusion of suture but it is very evident.

The three species A. elegans, occidentalis, and Robbinsii have the following characters in common: stipules large, but connate only below; leaflets green, often paler below, 5 to 7 pairs, thin, oblong, obtuse to retuse; flowers in heads or short spikes, pods in long racemes; calyx teeth less than half the tube; pedicels slender, in fruit nearly 2 lines long, equaling the subulate

bracts; pods with ventral suture very convex and raised, rarely sulcate dorsally, pods explanate on ripening by opening along the ventral suture from base to apex, septum standing up as a very thin hyaline membrane from rudimentary to ½ a line high, pods membranous, lunate to oblong-lunate, 4 to 6 lines long; peduncles long; stems slender; leaflets long-petiolulate. A. glabriusculus is also explanate and septum a mere edge but evident.

ASTRAGALUS MULFORDÆ. Boise City, Idaho, June 7th, 1892. A. Isabel Mulford. Prostrate perennial; stems slender, much branched, nodes about an inch apart, branches seemingly appressed, a foot high; stipules subulate, adnate, green, not connate, 1 to 2 lines long; leaves with filiform rachis and short petioles, 2 to 3 inches long; leaflets scattered, linear, 6 to 8 pairs, 2 to 3 lines long; plants almost glabrous except the sparsely pubescent calyx and young parts; peduncles with rachis of inflorescence filiform, 6 inches or less long, proper peduncle less than half the whole, subterminal; flowers many in a long raceme 2½ lines long, arched but keel nearly straight; pedicels and bracts minute, in fruit slender and a line long; calyx hemispherical not oblique below, ¾ line long; teeth green, subulate, nearly as long; tip of keel incurved at right angles, erect part as long as base and straight, acutish, a line high; wings narrowly oblong, narrower than keel, much arched, half a line longer than keel; banner abruptly bent to 110 degrees at calyx tips, ovate, sides reflexed especially at tip; flowers ascending or reflexed; pods pendent on slender stipe which is 1 to 1½ lines long, not jointed, outline oblong, body 4 lines long, 1½ lines wide, abruptly acute at each end, edges crimped, except at full maturity, and green, ventral suture much arched, dorsal nearly straight and sulcate to the middle of the pod, suture intruded the rest of the way, and 2-celled, cross section of pod about deltoid and sharply so with concave sides, pods membranous, not inflated, puberulent only when young, about straight, nearly the shape of A. Wingatensis in outline. This belongs close to A. recurvus Greene. Another specimen is referred here with much doubt collected by Cleburne below Weiser May 6, 1883.

ASTRAGALUS STRATURENSIS. The type is the writer's specimens from Silver Reef S. Utah, 5000 ft. alt. in gravel, May 5th, 1894, growing among bushes. Parry's specimen ticketed "St. George, Utah, 1874" and called A. atratus is the same but was never collected at St. George nor in any place nearer than the Pine Valley Mts. Stems tufted, many, ascending, 1 to 2 ft. high, from an open perennial base, slender nearly simple, flexuous, barely sulcate; nodes 1 to 3 inches apart; leaves widely spreading as in A. Rusbyi, none of them sessile, about 4 inches long; stipules not connate as in Rusbyi, triangular, green, recurved, small, adnate; leaflets about 8 pairs, narrowly elliptical or lanceolate (rarely some of the lower leaflets are oval, 4 lines long and 3 lines wide,) obtuse to retuse, generally folded, 6 to 9 lines long, long-petiolulate, nearly opposite, cuneate at base, pubescence almost none, hairs fixed by base, leaflets lighter below; flowering peduncles 6 to 8 inches long, in fruit often a foot long, slender, erect; flowers in racemes which are as long as or double the peduncle, 3 lines long, beautiful, ascending (pendent in fruit) calyx nearly round, not gibbous, a little flattened above like A. pictus Gray, ascending in flower, cylindric-campanulate tube a line long, greenish; short pubescent, not nigrescent; teeth a little shorter, the 2 upper triangular, the lower subulate; banner abruptly bent to 90 degrees at calyx tips, oblong-oval, 3 lines long, notched, sulcus very broad and shallow, shape ¼ of a circle at base of blade, nearly flat at apex, banner streaked with heavy purple lines within and lighter lines on the sides; sides reflexed ½ wide below, little above, purplish, white spot scarcely evident; wings bent up at tip of keel to 45 degrees, oblong-ovate, barely acutish at apex and white, darker below, 2 lines long, a line longer than keel, a line wide, concave to keel, tips the one vertical and the other horizontal and spreading; keel extends a line beyond calyx teeth, arched tip incurved to ¾ circle, short, triangular, acutish, dull purplish, base straight; pedicels and bracts minute and equal, ½ line long, bracts ovate, acute, green; pods arcuate, the dorsal side the more curved, ventral suture usually concave, raised, prominent and keeled, pods green, membranous, a trifle inflated, minutely pubescent when young, 6 to 8 lines

long, 1½ lines wide, 1 line high, deeply sulcate dorsally, triquetrous, pendent on stipe a line long and tapering shortly into it, 2-celled, obliquely apiculate with a declined mucro a line long. When the flowers are highly colored then the banner is deep-purple, white spot evident, cut up by heavy purple lines which run within ⅓ a line of the tip, wings are very prominent and white and often with a pink spot at base.

ASTRAGALUS FEENSIS. Dry, gravelly hills, Santa Fe, New Mexico, May 28, 1847, Fendler No. 151. See Plantæ Fendlerianæ. No. 16966 of the Engelmann collection. Perennial, densely tufted, stems almost none; stipules adnate, not connate, 2 lines long; whole plant except the pods densely appressed-strigose pubescent; leaves many, the petioles fully as long as the slender rachis, leaves 2 inches long; leaflets 7 to 8 pairs, oval, 2 to 3 lines long, folded, rounded to emarginate, shortly petiolulate; old leaf petioles persistent; peduncles slender, 3 inches long, capitately few flowered; pedicels very short; bracts minute; calyx tube cylindrical, 2 lines long, with short triangular teeth, not densely pubescent; pods sessile, linear-lanceolate, taper pointed, 9 lines long, 1½ lines wide and high, cross section triangular-cordate, ventral suture raised and thick, dorsal sulcate slightly and intruded fully to the ventral as a white partition, pods coriaceous, somewhat fleshy when ripe, minutely puberulent, arcuate. Probably allied to A. Parryi but pubescence, leaves, and pods very different, pubescence short and closely appressed. No flowers.

ASTRAGALUS ARTHURI. Lake Waha, Nez Perce Co., Idaho, 2-3500 ft. May 19, 1896. A. A. and E. Gertrude Heller. Dedicated to Mr. Heller Mr. Heller says, "It grows on basalt hillsides on the plateau below Lake Waha. The locality is rather stony, and is destitute of any ligneous vegetation. It is a striking plant on account of the abundance of flowers, which have the appearance of drooping. I first saw it in full bloom on the 3rd of June." Perennial from a stout, erect root, many, rather slender stems from the crown, ascending, plants 1½ ft. high; proper stems of few nodes, a few close together at the base, then 2 or 3 which are 1 to 3 inches apart, coarsely sulcate as well as

the peduncles, minutely and sparsely pubescent with fine appressed hairs fixed by the base; stipules triangular, adnate, not connate, small, about a line long; stems bent at all the nodes from which peduncles arise, since the latter are nearly as stout as the stems they appear terminal and erect; leaves about 4 inches long with a slender petiole 6 to 12 lines long, appressed; leaflets 10 to 14 pairs, oblong-elliptical, obtuse to retuse, 4 lines long, 1 to 1½ lines wide, long-petiolulate, opposite, tapering from the middle of the rachis to the tip, flat, distant; leaves mostly clustered at the top of the stems by the shortening of the upper internodes; peduncles about a foot long, strict, racemosely few-flowered above on the upper ⅓ of the peduncle; bracts subulate, 1 to 1½ lines long; pedicels a line long, rather stout, spreading in flower and reflexed in fruit, black-hairy; calyx nigrescent, hyaline, short-cylindric, 2 lines long, a little oblique below and thickened at the lower corner at insertion of pedicel; teeth subulate, a line long; mouth not oblique; flowers are like A. filipes, white, 6 lines long, blades about 4 lines long; keel arcuate nearly equally from base to apex, lunate, obtuse or tip sharply erect, about ½ a line high; wings narrowly oblong, ½ line longer than keel, about a line shorter than the ovate banner which is arcuate from the end of the calyx tube to nearly ½ circle and equally so throughout, sides reflexed much at the tip which is narrow; keel not dark tipped; pods narrowly linear, fully 2 inches long, 1½ lines wide, cross section round, gladiate, about the shape of pods of Brassica alba but narrower, acuminate at both ends, at the tip the dorsal suture is nearly straight and the ventral narrowed to it, at base the opposite is the case, dorsal suture the more arched, pod almost straight when ripe, ventral suture prominent externally, and thick at base, where it forms a stout stipe fully as long as the calyx, pods sulcate dorsally with a shallow and narrow grove, mature pods compressed and cross section obcordate-triangular with concave sides, many seeded, fully 2-celled, nearly glabrous, chartaceous, not fleshy, ventral suture the more arched at maturity. This is a unique Astragalus not closely related to any known species, somewhat resembling A. Congdoni and with the habit of A. Layneæ.

ASTRAGALUS NUTTALLIANUS var. ENNEAJUGUS. Leaflets at least in the upper leaves 9 to 10 pairs, oblong, emarginate, 6 or less lines long; plants stout, leafy, 1 to 1½ ft. high; stipules conspicuous, 2 lines long, adnate, not connate; peduncles shorter than the leaves in fruit or longer in flower; flowers several, about 3 lines long, in a head both in flower and fruit; pods arched most below, 10 lines long, 1¼ lines wide, ventral suture raised and pod much flattened laterally, smooth, ascending. Characterized chiefly by the unusually wide flat pods and many leaflets. The calyx lobes are nearly double the tube which is ¾ line long, filiform-subulate. Robust plants. Prairies of the Brazos Tex., March 1844 Lindheimer. Mo. Bot. Garden Nos. 17072, 17073.

ASTRAGALUS NUTTALLIANUS var. QUADRILATERALIS. Plants apparently erect, annual, a foot high; leaflets 6 to 7 pairs, oblong, emarginate, 5 or less lines long; peduncles longer than the leaves in fruit to twice as long, 2 to 4 inches long; flowers 3 to 6; pods congested at the apex of peduncle, smooth, gently arcuate, a line wide, an inch long, quadrilateral, shallow-sulcate at both sutures, sides rather concave, tip ascending, sharply acute; flowers not seen; plants rather stout and with large leaves. Northwestern Arkansas from Canehill to Ft. Gibson, on damp prairies, June 1835 Engelmann, Mo. Bot. Garden No. 17074; Indian Terr. Butler 1875, No. 17068.

ASTRAGALUS NUTTALLIANUS var. LEPTOCARPOIDES. Widely spreading to prostrate and slender plants; leaflets about 8 pairs, 2 to 4 lines long, emarginate, oblong-elliptical; most of the petioles very short; peduncles longer than the leaves, 2 to 3 inches long and slender; calyx lobes barely equal the tube; flowers rather large, 3 to 4 lines long, pods few, widely spreading, equally arched, not over ¾ line wide, 12 to 14 lines long, somewhat flattened, smooth, ventral suture not depressed, cross section triangular, barely acute, apiculate; seeds 20 to 26. Galveston Is. Texas, on dry prairies, May 1, 1843, Lindheimer. Mo. Bot. Garden Nos. 17070, 17071.

Astragalus Crotalariæ (Benth.) Gray P. A. A. vi 216. This species as Gray understood it is what must bear the name A.

Franciscanus Sheldon, though Mr. Sheldon has applied his name to plants that are either A. Menziesii or true A. Crotalariæ (Benth.) Gray, since Mr. Sheldon has made the type of his species the A. Crotalariæ Gray P. A. A. vi 216, excl. Phaca Crotalariæ Benth. Pl. Hartw. 307 which latter is the type of A. Crotolariæ (Benth.) Gray but not the plant which Gray has called by this name. Phaca Crotalariæ Benth. is either Astragalus Menziesii Gray P. A. A. vi 217 (*Phaca densifolia* Smith, Ree's Cyc. No. 9, *Phaca Nuttallii* T. & G. Fl. 1 343) or very near to it, and seems to be the var. virgatus Gray Bot. Cal. 1 149, though the material is so scanty that it can hardly be made out. There is little but the variable pubescence and stipules to separate Menziesii from Crotalariæ var. virgatus Gray, while the writer's own specimens from San Francisco collected during 1897 show all grades of stipules from free to connate.

Astragalus Franciscanus Sheldon has long flowers, very obtuse, membranous to chartaceous, large, strictly sessile pods, many leaflets, and hyaline stipules.

Astragalus oocarpus Gray P. A. A. vi 213, is the A. Crotalariæ or Crotalarioides Torr. Mex. Bound. 56 t. 17 and must be confined to that easily distinguished plant. It must be limited to those plants having coriaceous, inflated, stipitate, acute, erect, pods and small flowers. Much that Gray has referred to this is A. Douglasii. Mr. Sheldon has also confused this species with his Franciscanus having given that name to Cleveland's specimen from the Mo. Bot. Garden collection No. 16714 which is true oocarpus Gray.

Astragalus leucopsis var. leucophyllus (H. & A. Bot. Beechey 333) (A. *leucophyllus* T. & G. Fl. i. 336).

Astragalus Gibbsii var. falciformis (Gray) (A. *spcirocarpus* var. *falciformis* Gray Bot. Cal. i 152).

Astragalus Bigelovii var. Thompsonæ (Wat.) (A. *Thompsonæ* Wat. P. A. A. x. 345.)

Astragalus lotiflorus var. brachypus Gray P. A. A. vi 209. is not a good species. There are some variances in the pod that would lead to keeping it up as a variety as well as in the very short peduncle but it passes into the typical form at all

points. It has been said that the early flowers are long peduncled and sterile while the later ones are short peduncled and fertile, but this is not the case in any specimens seen. The fertile flowers are without remains of older peduncles, while the early flowers with long peduncles are also fertile so far as seen.

Astragalus nitidus Douglas Herb. Hort. Soc. Hooker Fl. i 149, cannot be definitely settled as distinct without a comparison with the actual types of Laxmanni and adsurgens. It is distinct from the figures of those species, and from the Japan species, but the specimens in American herbaria from Europe though seemingly distinct from our species vary much among themselves, and to add to the confusion are badly named.

Astragalus Hookerianus (T. & G. Fl. i 693) Gray Proc. Am. Acad. vi 215. The writer fails to see on what nomenclatural basis E. L. Greene in Pittonia iii 186 makes another synonym, *A. Somncanus*, for this species. On the DeCandollean basis the name of Torrey and Gray is tenable because the prior name in the genus *A. Hookerianus* Dietr. Syn. Pl. iv 1086 (1847?) is only a synonym for A. ervoides H. & A. Bot. Beechey 417. (1846); while on the Brittonian basis Phaca Hookeriana T. & G. (1840) antedates them all. Again Bunge 169 takes up the name A. ervoides Turcz. Fl. Baic. Dah. 340. "Bull. Soc. Nat. Mosc. 90 (1838)" which antedates the name of H. & A. and proposes to call it a synonym for a supposed species of A. Gray. Should the species of Turczaninow not prove to be a synonym then the name of Dietr. might stand as the first name in the genus with those who care to split hairs in order to make a synonym, but under the Brittonian system under which Mr. Greene is supposed to train his name is untenable. Should it be best to abandon the name A. Hookerianus for the Californian species there is already a name ready to take its place in A. Whitneyi Gray which hardly deserves to rank as a variety.

Vicia semicincta Greene. Goose Lake Valley, Cal., July, 1895. Mrs. R. M. Austin. Very leafy, 2 feet high, perennial with many slender underground stems; leaves widely spreading, about 4 inches long, of 10 pairs of oblong-linear to narrowly elliptical leaflets an inch long; leaflets obtuse, apiculate, the upper pairs

scarcely shorter than the lower, tendril about an inch long then 3-forked and forks long; stipules lanceolate-subulate to linear-subulate, 1 to 2 lines wide, 4 lines long, with linear lobe at base 3 lines long; stems sharply angled but not winged, nodes about 3 inches apart; peduncles 6 inches long, floriferous on the upper ⅓, slender, ascending; flowers 30 to 40, deep purple, 3 to 4 lines long, reflexed, narrow; calyx very oblique, upper part not over a line long, with small teeth, the lower 2 to 3 lines long including the subulate-linear teeth, at length hyaline; pods about an inch long, 3 lines wide, obliquely acute at both ends, oblong, smooth, 2 to 3-seeded, 6-ovuled and the seeds placed along the middle of the pod toward the ventral suture; pod pendent, flat, stipe a line long; whole plant minutely appressed silky except the pods; leaves sessile. This differs from V. villosa Roth. in 10 not 7 pairs of contiguous leaflets; lanceolate to linear, not ovate stipules; long peduncles, not yellow-villous; small flowers; pods with 2 to 3, not 6 seeds. It does not branch above. Mr. Greene rather hastily identifies this with V. cracca L. and his original description is very faulty. Its true relation to V. cracca is yet to be determined.

LUPINUS PINETORUM n. sp. Straggling perennial from a rather woody, underground, branching, slender stem, proper stems only a few inches long, slender, flexuous, with lower nodes very short and uppermost rarely over 3 inches long, subdecumbent and widely spreading, simple, distinctly pubescent throughout with short appressed hairs except the glabrous upper side of leaflets and the silky calyx, stems rather few, not appearing tufted; lower petioles 4 to 8 inches long, tapering, with small, subulate, inconspicuous stipules; leaflets about 7, 1 to 2 inches long, cuneate-oblanceolate, with thick mid-nerves, acute or apiculate, 3 to 5 lines wide; flowers in nearly sessile sparsely flowered; racemes a foot long fruiting pedicels stout, 3 lines long, horizontal; flowers large, purple, upper lobe of calyx deeply cleft and much shorter than the lower; pods appressed-shaggy, 1½ inches long, 4 lines wide, blunt and rounded at both ends, about 6 seeded, seeds flat and large. The peduncles are very

stout and terminal and appear subscapose. This is a unique Lupinus so far as the writer's observation goes. It grows on shady and rather damp north slopes under pines, and the flowers are very evanescent. Susanville, Cal, at Perkins's ranch, 4800 alt. June 26, 1897.

LUPINUS MAGNIFICUS n. sp. Perennial, tufted, acaulescent; leaves clustered at the crown, slender petioles 6 to 8 inches long with very short and inconspicuous stipules; leaflets about 7, 1½ inches long, narrowly elliptical, acute at both ends, about 3 lines wide; whole plant except the glabrous petals densely-woolly with slightly tangled appressed hairs and with many stouter hispid hairs especially on the stems and petioles, upper side of the leaflets greener; spikes on very stout (sulcate below) scapose peduncles which are leafy below and 2 to 4 ft. high and erect; spikes 1 to 2 feet long, dense, interrupted; flowers verticillate below, very many, on stout pedicels 2 lines long, about 8 lines long, brilliant pink-purple, wings 4 lines wide and 5 lines long, obtuse, banner broadly oval, a trifle shorter, with a small yellow spot in the center, keel acuminate-lunate and very sharp, yellow, as long as the wings; bracts caducous, small; calyx lobes about 3 lines long, the lower acuminate, and the upper broad and cleft to the middle, proper tube a line long. Fruit not seen. This is the most beautiful of all the lupines. Pleasant Canyon, Panamint Mts., Cal., 5500 ft. alt. in gravel along the wash. May 6, 1897. In some flowers the yellow spot on the banner is replaced by black-purple spot, most of the flowers are lighter on the claws.

LUPINUS MAGNIFICUS var. GLARECOLA. Whole plant long-hispid, lower stipules filiform-subulate, fully 6 lines long, pedicels slender, 4 lines long, flowers not over 5 lines long, peduncles 1 to 2 feet long and often branched, like the type with thick crowns 1 to 2 inches wide formed of the yellow-hispid imbricated leaf-sheaths, spikes often short-peduncled. Lone Pine, Inyo Co., Cal., 6000 ft. alt., on mesas. May 14, 1897.

LUPINUS EXCUBITUS n. sp. Shrubby perennial, 3 to 4 feet high; little branched below, simple above; summit of the woody

part with congested nodes only about 8 lines apart; stipules adnate to petiole for three lines in length and then prolonged a line more in a triangular point, the whole forming with the base of the petiole a clasping scale 2 to 3 lines wide; petioles stout and fleshy and sulcate when dry, with a knob on the end, flat, 1½ to 2 inches long, about ½ longer than the leaflets; leaflets oblong, oblanceolate, obtuse but apiculate, an inch long, often folded, 7 to 8; leaves on the season's growth with slender, round petioles, 2 to 4 inches long, with narrower subulate stipules, and narrowly-oblong-oblanceolate leaflets 2 inches long; leaves silvery with a compact very short and closely appressed, not woolly pubescence, the older leaflets seemingly velvety; peduncle terminal, with scattered leaves below and stout, scarcely striate, verticillately flowered from or even below the middle, with the petioles much less pubescent than the leaves, 2 to 3 ft. long including the rachis of the flowers, slender above, erect; flowers all verticillate and whorls 1 to 2 inches apart to the top; slender pedicels 2 to 3 lines long and ascending and with the calyx as silvery as the leaves; bracts subulate-lanceolate, caducous, 3 lines long; calyx lobes about 3 lines long, the upper a little shorter and but slightly notched; flowers about the same as in L. magnificus but 6 lines long and darker, or in some specimens white with a yellow center; pods about 2 inches long, contracted between the seeds, arcuate at base, acute, 2 to 2½ lines wide, closely appressed-hairy but silvery only when young, seeds at least 6, small; fruiting pedicels are stouter, appressed, and about 4 lines long. Forming conspicuous bushes on the gravelly mesas and on the cliffs. Panamint Canyon, Panamint Mts., Cal., on rocks and debris in the canyon, 4000 ft. alt., May 4, 1897, Shepherd's Canyon, Argus Mts., Cal., in clefts of the cliffs 4700 ft. alt., April 29, 1897. This is a more glabrous form with smaller flowers. Lone Pine, Inyo Co., Cal., on gravelly mesas 7000 ft. alt., May 14, 1897. The latter I take for the type of the species. This is evidently the interior representative of the L. arboreus group.

Trifolium Andinum Nutt. Acaulescent, cæspitose perennial from a much branched erect caudex, crowns half an inch wide. with densely imbricated stipules; leaves 1 to 3 inches long, all with slender petioles once to twice the length of the leaflets, whole plant sparsely silky-villous; leaflets 3, obovate to oblanceolate, acute, 6 to 9 lines long, usually folded, veiny, entire or with only rudimentary teeth; peduncles 2 to 3 inches long, slender, erect, head dense and rather many flowered, about ½ inch wide and high, broadly involucrate with 2 pairs of obliquely ovate to oval, hyaline, glabrous stipules with or without 3 sessile small leaflets at the tip, these stipules inclose the adjacent flower at maturity; calyx tube long-villous, 1½ lines long, equaled by the subulate teeth; pod hoary, flattish, obliquely obovate, 2 lines long, 1-seeded. Green River, Utah, June, 1896.

Glossopetalon spinescens var. aridum. Leaves obovate, 4 to 6 lines long; stipules subulate; parts of flowers in fives, stamens 8, one of the divisions of the calyx is smaller than the others, all very broad and hyaline margined; plants with very stout thorns, 6 to 12 inches high. Lepantha mine east of Hawthorne, Nev., 5500 ft. alt., in very dry places, May 25, 1897.

Cotyledon saxosum n. sp. Growing in tufts on the rocks, acaulescent; leaves very many, thick, semiterete, channeled, subulate-triangular, 1 to 2 inches long, 6 to 8 lines wide, smooth, very acute, green; peduncles stout, 6 to 10 inches long, bracteate above with triangular clasping bracts, the lowest bract 6 lines long, the uppermost 1 to 2 lines long on the pedicels; pedicels stout, 6 lines long, erect, enlarging with age, about as long as the flowers; whole inflorescence reddish, but young; petals yellow; calyx lobes lanceolate, 2 lines long; petals triangular oblong, acute, 5 lines long; capsules united only below, triangular-oblong, very acute, 4 lines long, translucent, erect, inflorescence corymbose, flowers many. Panamint Canyon Panamint Mts., Cal., 4000 ft. alt., May 4, 1897.

Œnothera bufonis. n. sp. Biennial, acaulescent; root leaves forming a rounded tuft, 2 to 6 inches long, lowest from anceolate to elliptical-ovate, with sinuous margins, tapering into

long, wide, margined petioles which enlarge at base becoming sheath-like; blade of the upper leaves lyrate-pinnatifid, with rather long, tapering apex, no terminal lode, all points acute, thin blades 1½ to three inches long, usually as long as petiole; whole plant softly villous with flattish, tapering, spreading hairs; slender calyx tube 2 inches long, gradually enlarging above; flower bud elliptical-oblong, about an inch long, tips not free nor evident, lobes linear in flower and an inch long; petals obcordate, yellow, 1 to 1½ inches long, reddening with age, vespertine; stigma lobes linear and anthers broadly so; capsule from lanceolate-conic to linear-lanceolate, 12 to 21 lines long, tapering from near the base, but apex not narrowed to a long tip, tip often short and thick, pod sharply 4-angled and rarely a little winged at the widest part, center of valves with a thick rib, margins with a filiform rib, reticulations scarcely evident, with scattered stiff hairs and minute rather than dense pubescence usually; seeds in 2 rows, closely packed, oblong, would be sub-cylindric were it not for a warty raised area covering ⅔ of the back, the smoother margin indistinctly pitted and wider above, about 1½ lines long, face with narrow groove below and opening into a deeper, rounded depression above.

This grows in the hot sand on the upper edge of the Larrea belt at about 5000 ft. alt., on Darwin Mesa, Argus Mts. Inyo Co. Cal. Collected May 8, 1897. This approaches Œ. xylocarpa Coville and Œ. primiveris Gray, but it grows in a wholly different zone from the former and the seeds are different.

Peucedanum Nevadense var. cupulatum n. var. Bracts of involucels united into a cup with hyaline margin, 3 to 4 lines long, oil tubes 8 to 9 on the commissure. Collected at Reno, Nevada, June 19, 1882, and April 22, 1897, at 5000 ft. alt. on gravelly mesas.

Peucedanum juniperinum n. sp. Nearly a foot high, from a tuberous root; stems single or few, purplish; nodes none or 2 to 3, and usually shorter than the enlarged sheathing petioles; the lowest internode often 1 to 2 inches long; leaves ternate to biternate with the divisions bipinnate, final divisions almost

linear to lanceolate, acute, 1 to 2 lines long; leaves about 3 inches long; whole plant ashy-puberulent and slender; flowers yellow; rays about 20, but fertile ones about 6, unequal, 1 to 2 inches long, the sterile very short; involucres absent, but rarely a single simple or leaf-like bract occurs; involucels of several, filiform-subulate, not hyaline bracts; fruiting pedicels 3 to 5 lines long; fruit 3 to 4 lines long, 2 lines wide, elliptical, wing a little narrower than the body, all the ribs evident, not raised, oil tubes 2 in the intervals except the marginal ones where they are 3, 4 on the commissure and with a delicate one on the inner edge of the wing, inner face flat.

Coalville, Utah, May, 14, 1889, among junipers; also at Carter, S. W. Wyo., June 25, 1896.

PEUCEDANUM ARGENSE. n. sp. Acaulescent, densely tufted crown thick with 2 inch-long, coarse fibers, the remains of many root sheaths; peduncles a foot or less long, stout, subdecumbent, 1 to 4 lines thick; whole plant hoary with short pubescence; leaves long-petioled, scarcely enlarged below and with no enlarged bases appearing above the fibers, tripinnate to almost quadripinnate, final segments about a line long, oblong to obovate, apiculate, thick, leaves nearly as long as peduncles; involucres none; rays stout, 1 to 1½ inches long, many, nearly equal; pedicels about a line long; involucels linear to lanceolate-subulate, about 2 lines long; fruit nearly round to oblate, truncate to emarginate below, 2½ lines long, thick wing about ½ the body, concave on the inner face, sparsely puberulent, dorsal ribs filform, not prominent, approximate, oil tubes 3 in the intervals, 4 on the commissure, rather large, placed near the margin, both faces of seed from flat to a little convex; flowers white, yellow or purple.

Lone Pine, Inyo Co., Cal., May 14, 1897, 7000 ft. alt. among rocks, in fruit; also in fruit at Darwin Mesa, Inyo Co. Cal., May 8, 1897, at 5000 ft. alt.; also at Darwin, Cal., April, 28, 1897, 4600 ft. alt. in flower.

This differs from P. villosum Nutt. in being much more robust, with nearly equal rays, no enlarged leaf-sheaths, leaves

pinnately and not ternately decompound, fruit round, thicker and smaller, and commissural oil tubes large and near the margin, while the other has delicate sinuous oil tubes near the center and with 1 to 2 threadlike ones in each wing near its base; both have similar flowers, habit, concave wings, pubescence, ultimate segments and approximate ribs. This differs from P. Mohavense Rose & Coulter in the few oil tubes on the commissure, smaller fruit, and not raised ribs. Leaf characters in P. Mohavense are not given in description. P. villosum was also collected in this region, but its habit is wholly different. At Darwin P. Argense grows on gravelly clay knolls and is the first flower out.

PEUCEDANUM SCOPULORUM n. sp. Acaulescent, densely tufted, glabrous, strong smelling, rigid; peduncles erect, stout, a foot high; leaves with many dead petioles at base, sheaths scarcely any; petioles and rachis of leaf round, tapering, nearly as long as peduncles; general outline of leaf narrow, blade 6 to 8 lines long, bipinnate with lowest pair of pinnules on each pinna again divided and enlarged as though ternate, final segments linear-oblong, 2 lines long, pungent, a little revolute, pinnæ distant sessile, 6 to 9 lines long, with about 4 pairs of pinnules; rays about 10, equal, 1½ inches long, rather slender; involucels unilateral, of several linear to subulate, often incised, green bracts, not hyaline, somewhat united below, 4 lines long; pedicels slender, 6 to 8 lines long; fruit not mature, 3 lines long, oval-ovate, flat, lateral wings ½ the body, ribs not raised, oil tubes apparently 2 in the intervals; stylopodium depressed; flowers appear yellow. This has the habit of Cymopterus anisatus, but the fruit of a Peucedanum. Pleasant Canyon, Panamint Mts., Inyo Co., Cal, among rocks, at 5500 ft. alt. May 6, 1897.

CYMOPTERUS LAPIDOSUS. *Peucedanum lapidosum* Jones Cont. i 246 (Zoe ii). This was described as having solitary oil tubes in the intervals. Recent collections show very similar material which cannot be separated from it which has 4 to 6 faint oil tubes in the intervals, while there are traces of them in

the type, the ribs are very variable, and in some specimens winged ½ as high as the lateral wings, in others they are not raised though there are traces of delicate papery prolongations. The writer would not be at all surprised to find that this is the long lost C. campestris Nutt., but a comparison with the type is impossible at present.

CYMOPTERUS CALCAREUS n. sp. Proper stems with internodes usually less than the imbricated leaf-sheaths which are about an inch long, occasionally the upper internode is 2 to 3 inches long and slender, stems tufted at the apex of a long, branching, rather slender root; glabrous; leaves tripinnate, ultimate segments 1 to 2 lines long, broadly linear, barely cuspidate, outline of leaf ovate, and about 6 inches long, petiole rather long; slender peduncles about a foot long, subscapose; flowers yellow; rays unequal, 1 to 1½ inches long, many; involucres none; involucels of several minute, subulate bracts; slender pedicels about 2 lines long; fruit oblong, 3 lines long, emarginate at both ends, wings widest below, about ¾ line wide, intermediate ones very much reduced above, often barely more than a ridge, but well developed below and like the rest thin; oil tubes 3 to 5 in the intervals, about 6 on the commissure. Seed sulcate rather deeply.

This seems to differ sufficiently from C. terebinthinus. Of the latter I have much material but cannot place this with it. Green River, Wyo., 6000 ft. alt., June 23, 1896. Carter, Wyo., June 25, 1896, in clay soil. What appears to be the same thing is from Carson City, Nev., June 2, 1897.

CYMOPTERUS PETRAEUS, n sp. with the habit of the last, but growing on rocks in tufts, more slender; leaves linear, bipinnate, divisions distant, very small, nearly linear, acute; petioles, sheaths and stems like the last; rays slender, few, unequal, 2 inches or less long; pedicels 2 lines long, bracts of the involucels small and narrow; fruit about 4 lines long and a line wide. narrowly-oblong, wings thin, very narrow, barely half as wide as the seed, intermediate wings rudimentary but always raised; oil

tubes about the same as in the above. The general appearance of the plant is that of Peucedanum Grayi.

Palisade, Nev., June 14, 1882. What appears to be the same is from Soda Springs, Nevada Co., Cal., July 26, 1881.

ACAMPTOPAPPUS MICROCEPHALUS n. sp. Widely branched shrub, about a foot high, season's growth about 3 inches long, slender; leaves acute, linear-spatulate, about 6 lines long, clustered on the branches; nodes about 2 lines apart on the lower stem and leaves short and fascicled in the axils of larger leaves, puberulent, resinous; plants leafy up to the filiform, bracteate, delicate pedicels which are 6 to 9 lines long; heads corymbose, 3 to 5, broadly obovate, 3 lines long; scales nearly smooth, outer ones barely greenish at tip, imbricated in about 3 series, broadly ovate to oblong, all but the inner ones acute, these fimbriate on the margins, 1 to 2 lines long; flowers 6 to 10, nearly twice as long as the inner scales, rayless, receptacle not fimbrillate; akenes densely villous with hairs bidentate at the apex; pappus of rather few bristles distinctly enlarged above and with some outer ones nearly as long and not enlarged, pappus as long as the flowers. This might be classed equally as well as an Aplopappus, but the habit and pappus are those of Acamptopappus. Lone Pine, Inyo Co., Cal., on rocks, 4000 ft. alt., May 14, 1897.

ERIGERON PORPHYRETICUS n. sp. Tufted from a shrubby base, stems round, rather flexuous, 1 to 2 feet high, erect, slender, sparsely corymbosely branched to even monocephalous with long leafy stems, equably leafy except the long peduncles (2 to 6 inches long) which are leafy bracted and bracts gradually reduced to rather small ones where they end an inch below the heads; whole plant short-hispid except the tips of the floral scales which are ashy granular and obscurely glandular; leaves flat, thin, lower ones spatulate-linear, and upper ones broadly linear, 1 to 2 inches long, 1 to 3 lines wide, acute, nearly double the internodes; heads 3 to 4 lines long exclusive of the rays which are many, ½ a line wide, 3 lines long, purple; pappus simple or with a very few hairs at base which are not longer than the stiff hairs of the akene; setæ rather many, coarse,

scabrous-denticulate; akenes sparsely hairy when mature, more densely hairy when young, 2 to 3-nerved and mostly flat; bracts many, linear, with narrow white margins, very acute, as long as the flowers, in one series with a few outer shorter ones of varying length. This has the habit of E. filifolius and E. cæspitosus, and belongs to that section. What relation it bears to E. Covillei Greene Erythea iii 20 cannot be determined from the imperfect description of the latter. Hawthorne Nev. 5000 ft. alt. on lava rocks in Big Indian Canyon, May 27, 1897. Also Lone Pine, Inyo Co. Cal. on granite rocks, 4000 ft. alt. May 13, 1897.

Aster venustus Jones. Mr. Greene in his attempt at revision of Aster calls this a synonym of A. Parryi, evidently without the least knowledge of the species, he having misinterpreted my reference to it in Contributions vii. I was there comparing the four species of the group, showing that A. venustus bears the some relation to A. Parryi that A. Wrightii does to A. xylorhiza, but expressing no opinion as to the validity of any one of the four.

Baileya nervosa n. sp. Annual, erect, many-stemmed, stems sparingly branched, a foot or less high; root leaves rosulate, oblanceolate, on long margined petioles, entire to obtusely 3-lobed, 2 to 3 inches long, stem leaves with shorter or no petioles, similarly lobed, and lobes oblong, rounded, crenately and sparsely toothed, bracteal leaves linear and entire, 6 to 9 lines long; whole plant floccose-woolly; stems very leafy; peduncles slender, 1 to 3 inches long above the last bract; heads 4 lines long, 6 to 8 lines wide exclusive of rays; scales linear; ray flowers golden-yellow, 4 lines long, broadly obovate, obtusely 3-toothed, 10 to 25, becoming white with age; akenes contracted below, truncate above, ray akenes, 3-angled and with 1 to 5 intermediate ribs, all much raised and rounded like wings, sparsely hispid with blunt, stout projections, but not glandular, 1½ lines long, narrowly obpyramidal, disk ones similar but less angled and with a tuft of projections appearing like hairs but too coarse and stout and as though glandular, ray akenes bare at the top and ribs united there. Darwin Mesa, Argus Mts. Cal. 5000 ft. alt., in gravelly soil, May 11, 1897. Compared with B. multira-

diata this is nearly ½ smaller, with smaller flowers and short peduncles, and stems very many and leafy.

Phacelia perityloides Coville is a good species and not referable to P. glechomæfolia Gray. The writer has collected it and carefully studied it in the field.

AMSINCKIA CARNOSA. n. sp. Allied to A. vernicosa H. & A. Bot. Beechey 370. 1 to 2 ft. high, erect, branched below, with long, rather strict, rarely branching branches, glaucous when fresh, annual, very leafy; leaves usually double the internodes, 3 inches or less long, narrowly lanceolate to ovate-acuminate, folded, sessile with cordate base, softly fleshy and pulpy, wilting quickly but drying slowly, when fresh they appear nearly smooth except with slender and sparse acicular hairs on the margins and occasionally with one or more on the midrib, when dry most of the leaves are covered with peltate, white pustules with or without a minute cusp; inflorescence with 1 to 4 glomerules arranged racemosely, which are nearly sessile or leafy bracted when peduncled, elongating to about 3 inches, rarely 6 inches in fruit, inflorescence rather sparsely setose-hispid with tapering yellow-tipped needles 2 lines long with large pustulate base; calyx with oblong-lanceolate lobes in flower and 3 lines long, in fruit acuminate-lanceolate and about 8 lines long; corolla tube 5 to 6 lines long, golden-yellow; stamens inserted in the throat; limb barely 2 lines long; fruit of 3 narrowly elliptical to lanceolate obtuse nutlets, 2½ to 3 lines long, with concave sides, straight, smooth and shining, scar very narrow, edges sharp and thin. Shepherd's Canyon, Inyo Co. Cal. 4600 ft. alt. April 30, 1897. Growing along the roadside among loose rocks. Whether this is a form of A. vernicosa I cannot tell as that species is so poorly described in the Botany of California and the Synoptical Flora that its character cannot be made out, and I have not access to the original description or type.

GILIA LATIFLORA var. CANA. Leaves densely and permanently white-woolly. Flowers longer and paler. Lone Pine, Inyo Co. Cal., 4600 ft. alt., April 27, 1897.

GILIA OCHROLEUCA n. sp. Section Eugilia Bentham. Annual, delicate, widely branching from the base and branches

cymosely branched above; leaves clustered at the base and scattered on the stems but much smaller there, all pinnately parted into several broadly-linear, obtusish lobes, but stem leaves with shorter lobes, thickish, glabrous or with scattered hairs, inclined to be glaucous; petioles almost none; internodes elongated; flowers cymose, on filiform pedicels about 6 lines long with the upper portion glabrous and the lower (with adjacent stem only) glandular, whole plant otherwise glabrous, pedicels never reflexed, erect; flowers yellowish-white, 2 to 2½ lines long, the upper half funnel-form, the lower half tubular, about as long as calyx; calyx a line long, teeth triangular, acute but not aristate, ⅓ the tube; capsule globose-oval, as long as calyx; seeds developing mucilage and spiricles. Plants about a span high, growing in sand on Darwin Mesa, Argus Mts., Cal., at 5000 ft. alt., May 1, 1897. This differs from G. micromeria Gray in the spiricles and mucilage, the glandular pedicels, and funnel-form-tubular and longer corolla.

GILIA CALCAREA n. sp. Section Giliandra Gray. Biennial, 2 ft. high, erect, corymbosely branched throughout with innumerable racemose subdivisions (but flowers centrifugal in order of anthesis) the whole forming an obovate mass fully a foot broad completely covered with single not glomerate flowers, sparsely glandular-stipitate pubescent throughout except the lower leaves; fruiting pedicels 2 lines long, erect; lower leaves about 3 inches long, rather stout, pinnately parted below into narrowly to broadly-oblong or even obovate, obtuse but apiculate leaflets, 1 to 2 lines wide, leaflets inclined to be larger toward the tips, the uppermost divisions pass into mere lobes or teeth of the enlarged terminal lobe, occasionally a lobe is found with a tooth on the lower side; stem leaves linear and passing into broadly-linear bracts which are mostly 6 lines long, the middle stem leaves have 1 to several linear lobes, all leaves have minute pungent apiculations; calyx in flower campanulate-cylindric, barely a line long, with green and broad bands which terminate in deltoid to ovate-triangular obtuse but cuspidate teeth which equal ⅓ the tube, calyx enlarges in fruit to about 1½ lines long, closely investing the oval and obtuse capsule which is about 2¼

lines long; seeds without mucilage or spiricles; corolla tube barely 2 lines long, white or yellowish, a trifle longer than the widely spreading obovate, obtuse, sky-blue lobes; anthers round to reniform, very small, white, on tapering blue filaments, but little exserted; style in flower barely equaling the anthers, in fruit 4 lines long, 3-lobed, blue. Green River, Wyo., 6000 ft. alt. in poor clay soil. June 23, 1896. This differs from G. pinnatifida Nutt in the obtuse broad lobes of the leaflets, and in the broad terminal one, in the general outline of the inflorescence being corymbose and not thyrsoid, flowers not in clusters, and half the size, calyx lobes broad and not triangular-acute, anthers round and not ovate and half the size.

PENTSTEMON SUDANS n. sp. Shrubby, 1 to 2 ft. high, stems rather tufted, erect, the season's growth about a foot long, whole plant glandular-short-hairy even to the flowers, especially above; lower leaves obovate to oblanceolate-oblong, tapering into a short winged petiole, 1 to 2 inches long, the upper ones an inch long, ovate-oblong, sessile with rounded base, scarcely reduced above, all sharply, irregularly and rather deeply serrate and with white mucro, only the upper ones acute; internodes shorter than the leaves; flowers in an interrupted but nearly continuous spike 4 to 6 inches long; bracts small, cordate-ovate, much shorter than the flowers, mostly entire, a few of the lower sometimes larger and leaf-like; peduncles and pedicels almost none; calyx tube campanulate, a line long, teeth triangular, green, not margined, a line long; flowers dull white, 6 lines long, thick, little ampliate above, distinctly bilabiate, lobes 2 lines long, the 3 lower reflexed; anthers opening from the top to the base but not explanate fully, each cell oblong-oval, sterile filament glabrous, filiform. This is near to P. deustus. It grows on very hot and dry lava rocks between Amedee and Susanville, Cal., 4000 ft. alt., June 24, 1897.

ORTHOCARPUS COLUMBINUS n. sp. Slender, annual, 6 to 12 inches high; branched at all the nodes but main stem erect and stout for the slender plant, branches slender and nearly erect, the lower very long; nodes 1 to 2 inches apart; leaves and bracts entire and similar, 1½ to 2 inches long, thin, linear-lanceolate,

tapering from base, obtuse, contracted at insertion; whole plant glabrous except lower part of calyx which is shaggy with long flat and jointed hairs, the adjoining bracts have a few scattered hairs at base and the corolla is minutely puberulent; spikes capitate in flower, scarcely denser than racemose in fruit; pods nearly sessile; bracts 1 to 1½ inches long, surpassing the flowers, uncolored and not enlarged; fruiting calyx 3 to 4 lines long, the narrowly triangular teeth equal the tube and are glabrous; capsule ovate, half as long as the calyx; corolla yellow, tube almost filiform, 9 lines long, abruptly dilated at apex, the galea is subulate, straight, acute, nearly 2 lines long, surpassing the greatly inflated lower portion (exclusive of the teeth) by ½ a line, whitish teeth of the lower lip oblong about ¼ a line long, lower lip inflated like a pouter pigeon, nearly 3 lines wide, 1½ lines long; anthers not inclosed in galea fully, 1-celled; seed coat loose. This differs from O. campestris Benth. conspicuously in the yellow flowers, and other characters. Prattville, Cal., 4500 ft. alt., July 3, 1897.

Pedicularis albomarginata n. sp. Perennial, tufted, erect from an ascending base, 1 to 2 feet high, rather stout, simple; leaves many, appressed, linear, 3 to 4 inches long, 2 to 3 lines wide, obtuse, margined petiole nearly equaling the blade which tapers into it, blade shallow-crenate and crenatures again obscurely crenate, margins white, callous; plants glabrous except the lower leaves, and midrib of some others, pubescence of minute crisped hairs; flowers in oblong heads which are 1 to 2 inches long, in fruit 4 to 6 inches long, dense; bracts as long as the calyx tube, 4 lines long, gradually passing into leaves below, crenate, oblong; calyx tube ovate, 2-toothed; corolla 9 lines long, bright pink-purple, galea 2 to 2½ lines wide at the blunt tip which is incurved nearly 90 degrees or a trifle more, tip truncate, apiculate on the lower corner; lower lip 2 to 3 lines shorter, very broad, lobes reflexed, wider than long, rounded, the central one much the largest, fully a line long and three lines wide. This is very close to P. crenulata Bentham but is glabrous and with lower lip of corolla conspicuously shorter than the upper. Deep Creek, E. Nevada, in Steptoe Valley in low

meadows, 7300 ft. alt., June 30. 1897. Distributed as P. crenulata.

ABRONIA ANGULATA n. sp. Annual with the habit of A. villosa Wat. Much branched from the root, stems stout and succulent, whole plant very glandular-villous even to the flowers except the glabrous and coriaceous leaf-blades; stems and petioles deeply sulcate when dry; nodes 2 to 4 inches apart; stout petioles rarely less than ½ the blade; blades 1 to 2 inches long, cordate to truncate below, rounded above, ovate to broadly oblong, lighter below, upper leaves much reduced; stems floriferous throughout except the lowest portions; peduncles short but longer than the leaves, 1 to 3 inches long, slender in fruit, often reflexed; bracts white, oval to broadly ovate, about half as long as the flowers, acutish, 3 to 4 lines long, not reflexed; flowers with slender greenish tube, about 2 lines wide at tip, white or outer side tinged with pink; fruit 2 lines long, body oblanceolate ¾ line wide, wings but little contracted below, fully a line wide at the produced, thin apex, the fruit in outline seems obcordate, glabrous except the ciliate wings. This seems to be intermediate between the cycloptera and fragrans sections, but near to A. villosa. Darwin Mesa Argus Mts. Cal. 5000 ft. alt. on drifting sand dunes May 11, 1897.

ERIOGONUM STOKESÆ. n. sp. Either a winter-annual or short-lived perennial, proper stems woody, 3 to 4 inches long, densely clothed with a multitude of densely short-woolly, thick, obovate to rhombic-obovate leaves, with an abrupt apiculation and tapering into a stout petiole half as long as the blade, the whole 1 to 1½ inches long, pubescence permanent; flowering stems many, not slender, umbellately branched 4 to 6 inches above the base into simple or compound racemes fully as long as peduncle, floccose-woolly, leaves none on the stems above the root clusters; bracts 3, 1 to 2 lines long, subulate, barely connate; involucres sessile on the upper side of the rachis, barely angled, with short, erect, triangular lobes about 2 lines long; flowers 25 to 30, on filiform exserted pedicels, glabrous externally, white with green midribs, oblong-obovate in the bud, with tapering winged base nearly as long as the body and then jointed to the pedicel, the

shape of the flower is much the same as that of E. umbellatum, 2 lines long, lobes oblong-oval, rounded, equal, outer three winged on the midrib; anthers exserted, purple; flowers woolly within at base. This probably belongs with the E. racemosum group, but is unique. Dedicated to Miss Stokes of Salt Lake City who has done much work on the genus. Pleasant Canyon, Panamint Mts. Cal. 3300 ft. alt, among rocks, May 6, 1897.

ATRIPLEX DRACONIS n. sp. Annual, with the habit of A. argentea and Amarantus albus, 1 to 2 feet high, much branched, stems stout and thick, central one erect, lower lateral ones prostrate, whole plant forming rounded ovate tufts, slightly mealy; leaves all alternate, on petioles from ½ to as long as the blades, about 2 inches long, ovate to triangular, cuneate at base, sharply acute, palmately 3-nerved, moderately thin; fruit in dense clusters in the axils of all the leaves, some flowers in fruit on slende pedicels 6 to 8 lines long, and thickened above, others sessile in the same cluster; bracts united nearly to the top, almost linear, acute, not toothed, 3 to 4 lines long, at the base produced into unequally laciniate lobes 1 to 2 lines long which also sometimes have green ridges or teeth on their sides, this gives the fruit a fantastic appearance, of halberd shape. Diœcious. Wadsworth Nev. 4300 ft. alt. on sand dunes, June 15, 1897.

ARABIS GLAUCOVALVULA n. sp. Perennial with a woody base, crowns 1 to several, densely leafy, stem leaves scattered, broadly linear, acutish, sessile, not clasping nor auricled, 1 to 2 inches long, reduced above to similar and shorter bracts; crown leaves about 3 inches long, flaccid, almost linear, entire, gradually reduced to the broad margined petiole which varies from nothing to twice the blade; all leaves entire, soft and minutely woolly, seems weakly erect, simple or with few smaller lateral branches, 1 to 2 ft. long; racemes long and many flowered; fruit pendent on a stout pedicel 4 lines long, 1½ to 2 inches long, flat, 2½ to 3 lines wide, rounded at both ends, glaucous, 1-nerved, obscurely veiny, style appearing as a minute knob as long as wide; seeds in 2 rows, very broadly winged, 2 lines wide from edge to edge, seed proper but little over ½ line wide, wings beautifully meshed with roundish meshes, cotyledons elliptical, and radical

long; flowers purple, rather large. This grows scatteringly throughout the region from Lone Pine to the Argus Mts., Cal., on gravelly mesas, usually under desert shrubs which give it support as it straggles up through the open branches, when growing alone it is shorter and less flexuous. Darwin Mesa, Argus Mts., 5000 ft. alt., May 8, 1897, etc.

ARABIS PULCHRA var. GRACILIS. More slender, flowers about ⅔ as large, pods glabrous and flattish even when young while those of the type are round when young and not at all flattened. Shepherd's Canyon, Argus Mts., Cal., 4800 ft. alt., May 1, 1897.

ARABIS DISPAR n. sp. Perennial from a woody cæspitose base, crowns many, fasciculately leafy, with very many small blades 4 to 8 lines long, entire, spatulate, acute, densely stellate leaves which taper into channeled, slender, green, margined petioles which are enlarged and fleshy at very base, petioles usually twice to thrice the blades; slender, simple stems 6 inches high, erect, with internodes about as long as the broadly linear, sessile, not clasping nor auriculate, acute stem leaves which are 6 to 12 lines long and not reduced above; flowers few, in small heads which become short racemes in fruit, purple, 2½ lines long, erect, puberulent; sepals purplish, elliptical-oblong, obtuse, hyaline margined, ⅓ shorter than the purple, narrowly oblong, veined petals; pedicels in fruit 4 lines long, stout, ascending; pods smooth, erect, 3 inches long, ¾ line wide, flat, not tapering nor acuminate at apex, and style none, in immature pods the tip is a trifle narrowed, nearly straight; seeds nearly in one row, not margined. This appears to be nearest to A. Parishii Robinson. It grows on rocky hillsides in Pleasant Canyon, Panamint Mts., Cal., 5500 ft. alt., May 6, 1897.

CEANOTHUS MARTINI n. sp. Slender open branched shrub with gray bark, thornless, young stems closely pubescent, whole plant otherwise glabrous; leaves oval to nearly round, generally emarginate, thin, truncate to very short cuneate at base, slender petioles 2 to 3 lines long, stipules subulate, deciduous, leaves palmately 3-nerved, not resinous, scarcely paler below, minutely toothed except at base, flowers from the season's growth, spikes

usually simple, occasionally with one or two at the base, 1 to 3 inches long, flowers white. Fruit not seen. The leaves have the general outline of C. velutinus but the plant has not the slightest resemblance to that species otherwise. The last season's peduncles are persistent, slender, and might in drier situations become thorny. Manti Canyon, Utah, near its mouth on hillsides, June 14, 1895. Dedicated to Rev. George W. Martin a zealous local botanist of Utah.

INYONIA n. gen. Anthers not tailed, tube funnelform, yellow, tips triangular and short, anthers surpassing the corolla by a line; corolla 3 lines long, flesh-colored, with very short triangular lobes which become purplish with age, about ⅛ longer than the pappus; style branches linear, round, obtuse, but little exserted; pappus of several long, flat, very narrow, denticulate scales which are often setiform above, with very many interspersed setæ of varying length, all scabrous, persistent and stiff; akenes very hairy with bidentate hairs, rather obpyramidal, 3-angled, not winged, 1 to 2 lines long, black; involucral scales linear, green, 3 lines long, scarcely margined, obtuse, appressed, thick, distinct, in one series, with one or more outer bractlike ones which pass into the adjoining leaves.

INYONIA DYSODIOIDES n. sp. Leaves very many, 6 to 9 lines long, terete, linear, entire, obtuse, rather fleshy, about ½ a line wide, punctate, and resinous, narrowed at insertion, alternate; internodes barely a line long, stems round; a round topped shrub, several feet high, fastigiately branched; heads 5 lines high, single, terminating leafy branches, but general appearance corymbiform, stems gray with close bark. This has the habit of Aplopappus laricifolius, but in other respects is close to Dysodia. Panamint Canyon, Panamint Mts., Cal., 2000 ft alt., in gravel and among rocks. May 3, 1897.

Priority of Names in Contributions No. vii.

In Contributions No. vii there is a conflict of dates with the publication of the Synoptical Flora revised by Dr. Robinson. A recent conversation with him makes it clear that the signatures of the Synoptical Flora were printed before mine were, and it is almost certain that the complete work was distributed before my copies were sent out, as I read three revises of proofs after the date given on the bottom of the signatures of my Contributions, which was the date on which the printer set up the manuscript. It is probable that three or four weeks elapsed after the signature date before the copies were distributed. Therefore Gray is to be credited with the following name instead of myself:

Clematis verticillaris var. Columbiana.

The Synoptical Flora becomes the place of prior publication of Lepidium scopulorum Jones.

Ranunculus Cusickii Jones was with little doubt described from the same specimen from which Greene described his R. Populago before Greene named his species.

Acer glabrum var. tripartitum should be credited to Pax instead of Jones.

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